

DOCKET NO: 295335US0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
KARL OTT, ET AL.	: EXAMINER: NOAH S. FRANK
SERIAL NO: 10/591,662	:
FILED: SEPTEMBER 5, 2006	: GROUP ART UNIT: 1796
FOR: NOVEL SOLVENT FOR PRODUCING POLYURETHANE DISPERSIONS	:

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal of the Final Rejection dated October 29, 2008. A Notice of Appeal was timely filed on March 30, 2009.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is BASF AKTIENGESELLSCHAFT, having an address of Ludwigshafen 67056, Germany.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the assignee are aware of no appeals, interferences, or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 15-25 stand twice rejected and are herein appealed. Claims 1-14 are canceled.

IV. STATUS OF THE AMENDMENTS

No amendment under 37 CFR 1.116 has been filed. A Request for Reconsideration filed January 29, 2009, is in the record.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

It is preliminarily noted that references in brackets are to page and line number of the specification as filed.

Independent Claim 15 provides a process for preparing an aqueous polyurethane dispersion wherein before being dispersed, the polyurethane is produced in the presence of N-ethylpyrrolidone or N-cyclohexylpyrrolidone [page 2, lines 8-15 and 30]. The prepared polyurethane comprises at least one hydrophilic group or a group which can be converted to a hydrophilic group [page 3, lines 18-21; page 10, lines 1-12]. The polyurethane thus prepared in the presence of N-ethylpyrrolidone or N-cyclohexylpyrrolidone is then dispersed in an aqueous medium [page 3, line 24; page 15, lines 5-13].

Appellants have described that first preparing the polyurethane in the presence of N-ethylpyrrolidone or N-cyclohexylpyrrolidone followed by dispersion in an aqueous medium

provides performance advantages not achieved by conventional technology where a solvent is added to the dispersion after its preparation to adjust the physical parameters of the finished dispersion [page 16, lines 21-40].

Claims 16-24 depend from Claim 15 and stand or fall with the independent claim.

Independent Claim 25 describes a method for preparing an aqueous dispersion of a water dispersible polyurethane wherein N-ethylpyrrolidone or N-cyclohexylpyrrolidone is added to the reaction mixture for forming the water dispersible polyurethane [page 2, lines 8-15 and 30]. The arguments presented below equally apply to this claim and the two independent claims are argued together.

VI. THE REJECTION TO BE REVIEWED ON APPEAL

Claims 15-25 are twice rejected under 35 U.S.C. 103(a) as being unpatentable over Bruchmann et al. (DE 10161156; equivalent to U.S. 2005/0043467) in view of Galan et al. (U.S. 4,757,095).

VII. ARGUMENT

Rejection of Claims 15-25 under 35 U.S.C. 103(a) as being unpatentable over Bruchmann et al. (DE 10161156; equivalent to U.S. 2005/0043467) in view of Galan et al. (U.S. 4,757,095).

Bruchmann is directed to polyurethane dispersions which are prepared with nontoxic catalysts [0015] and describes an aqueous dispersion of a water dispersible polyurethane and a process for preparing the aqueous dispersion involving reacting the monomers in the presence of a cesium salt (Abstract).

Nowhere does this reference disclose or suggest the addition of N-ethyl- or N-cyclohexylpyrrolidone to the preparation of the prepolymer mixture. Appellants have previously noted (Response to Official Action dated October 29, 2009, filed January 29, 2009, page 6, lines 1-5) that Bruchmann actually indicates a preference that the described aqueous dispersions be free of solvent in [0085], by stating:

The dispersions preferably have a solvent content of less than 10% by weight, and are, **with particular preference, free from solvents.** (Bold added)

The Examiner has acknowledged that “Bruchmann does not teach preparing the polyurethane in the presence of N-ethylpyrrolidone or N-cyclohexyl pyrrolidone (Official Action dated October 29, 2008, page 2, lines 21-22) and cites Galan to show the use of lactones and lactams.

Galan describes a process for preparing a polyurethane-polyurea composition utilizing prepolymers prepared in the presence of lactones or lactams. The prepolymers are then employed to prepare the polyurethane-polyurea composition as microcellular foams.

In the Advisory Action dated February 24, 2009, (page 2, lines 5-13), the Examiner has stated:

In response to applicant’s arguments that Bruchmann indicates a preference that the dispersions be free of solvent . . . , a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art, including nonpreferred embodiments. MPEP 2123. Additionally, Bruchmann teaches that, “if a solvent has been used in preparing the polyurethane, it is usual to remove the majority of the solvent from the dispersion, for example by distillation under reduced pressure. . . . Even if Bruchmann distilled off all of the solvent, the combination would still read over the claimed invention.

Appellants submit that Bruchmann reasonably suggests that if a solvent is used, it should have a boiling point of from 40 to 100°C. under atmospheric pressure [0081] and that one of ordinary skill in the art would recognize that having a boiling point in the described

range would allow for facile removal by distillation under reduced pressure as described. In regard to the Bruchmann description, Appellants note that the boiling points of N-ethylpyrrolidone and N-cyclohexylpyrrolidone, the components of the claimed invention, are 97 °C/20mm Hg and 154 °C/7 mm Hg respectively (see attached Sigma-Aldrich products descriptions). Therefore, one of ordinary skill in the art would recognize that the claimed components do not have the boiling point properties suggested by Bruchmann.

Moreover, if N-ethylpyrrolidone or N-cyclohexylpyrrolidone were added to the Bruchmann dispersion, since neither solvent would be easily removed as described in the reference, its presence would change the principle of operation of the Bruchmann dispersion, i.e., solvent would be present (M.P.E.P. § 2143.01 VI.).

The Examiner has supported the combination of the cited references (Official Action dated September 29, 2008, beginning on page 2, line 22 and continuing to page 3) by stating:

However, Galen et al. teaches using lactones and lactams in the preparation of polyurethanes (Abs). A particularly suited lactam is N-ethylpyrrolidone (6:35-40). Bruchmann and Galan are analogous art because they are from the same field of endeavor, namely polyurethane additives. At the time of the invention a person of ordinary skill in the art would have found it obvious to have used N-ethylpyrrolidone, as taught by Galan, in the invention of Bruchmann, in order to make a polyurethane product with the unexpected and improved properties when compared to polyurethane elastomers which are prepared in the absence of either a lactone or a lactam, such as good cold temperature flexibility.

Appellants have previously argued that the two cited references are directed to unrelated technology (Response to Official Action dated October 29, 2009, filed January 29, 2009, beginning on page 6, line 17 and continuing to page 7, last line) and again submit that Galan is directed to a non-aqueous technology (microcellular foam systems) employing polymers not specifically composed to be water dispersible and therefore does not describe technology related to preparing an aqueous dispersion. Nowhere does this reference disclose

that the polyurethane is water dispersible nor is there any suggestion regarding water dispersibility of the polymer composition.

In the Advisory Action dated February 24, 2009, (page 2, beginning at line 14 and bridging to page 3), the Examiner has expressed the opinion that:

In response to applicant's arguments that Bruchmann and Galan are nonanalogous art, both are drawn to polyurethane products. The fact that one is applied via an aqueous dispersion and the other is foamed is irrelevant. The only difference between a foamed polyurethane versus a coating applied via an aqueous dispersion is the presence of bubbles inside the polyurethane.

Appellants respectfully submit that the Examiner's opinion comprises a naïve approach to two very different technologies. Galan is directed to polyurethane microcellular foam systems for molded applications such as shoe soles, tires, machine parts, toys and reaction injection molded products. The polyurethane properties and requirements for these uses are different than those for aqueous polyurethane dispersions for adhesive and coating applications of Bruchmann. The two references do not pertain to the same field of endeavor, do not deal with the same problems and are therefore nonanalogous art.

The Examiner has not adequately explained how one of ordinary skill in the art of aqueous dispersions of polyurethanes would reach to nonaqueous injection molded polyurethanes to improve a method to prepare the aqueous dispersion.

When prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than hindsight gleaned from the invention itself. *Interconnect Planning Corp.* 774 F.2d, 1143, 227 USPQ 551.

Something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co.* 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984)

Applicants respectfully submit that only in hindsight, in view of the claimed invention, would one of ordinary skill in the art combine the cited references. The Examiner has compared the improved flexibility of a film obtained with the claimed aqueous dispersion to the flexibility of a foamed polyurethane shoe sole (Official Action dated September 29, 2008, page 3, line 5). However, Appellants submit that a relationship between the two is not established and one of ordinary skill in the art would not expect a property of a shoe sole to apply to a thin film coating. Moreover, flexibility in a shoe sole may not be comparable to flexibility of a film coating. Appellants submit that the Examiner has not provided any reasonable explanation of how or why one of ordinary skill in the art would have combined the cited references to obtain the claimed invention, at the time of the present invention.

In a Precedential Opinion rendered by the Board of Patent Appeals and Interferences (Ex parte Whalen II, Appeal 2007-4423, p. 16, lines 5-9, decided July 23, 2008) the Board stated:

The KSR Court [KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007)] noted that obviousness cannot be proven merely by showing that the elements of a claimed device were known in the prior art; it must be shown that those of ordinary skill in the art would have had some "apparent reason to combine the known elements in the fashion claimed."

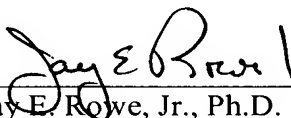
Appellants submit that the Examiner has not shown that one of ordinary skill in the art would have had reason to combine the description of the cited references to obtain the claimed invention.

CONCLUSION

For all the above reasons, the rejection of Claims 15-25 under 35 U.S.C. 103(a) as being unpatentable over Bruchmann et al. (DE 10161156; equivalent to U.S. 2005/0043467) in view of Galan et al. (U.S. 4,757,095) should be reversed.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



Jay E. Rowe, Jr., Ph.D.
Registration No. 58,948

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/07)

VIII. CLAIMS APPENDIX

Claims 1-14 (Canceled).

Claim 15 (Rejected): A process for preparing an aqueous polyurethane dispersion, comprising:

preparing a polyurethane in the presence of N-ethylpyrrolidone or N-cyclohexylpyrrolidone; and

dispersing the prepared polyurethane in an aqueous medium, wherein

the polyurethane comprises at least one component having at least one hydrophilic group or a group which can be converted to a hydrophilic group, and is dispersible in water.

Claim 16 (Rejected): The process according to claim 15, wherein the preparing a polyurethane in the presence of N-ethylpyrrolidone or N-cyclohexylpyrrolidone comprises reacting

- a) at least one polyfunctional isocyanate having 4 to 30 carbon atoms,
- b) diols comprising
 - b1) 10 to 100 mol%, based on the total amount of diols (b), having a molecular weight of from 500 to 5000 and
 - b2) 0 to 90 mol%, based on the total amount of diols (b), having a molecular weight of from 60 to 500 g/mol,
- c) optionally additional polyfunctional compounds, other than the diols (b), containing reactive groups which are alcoholic hydroxyl groups or primary or secondary amino groups and

d) monomers other than the monomers a), b) and c), containing at least one isocyanate group or at least one isocyanato-reactive group, additionally carrying at least one hydrophilic group or a group which can be converted to a hydrophilic group.

Claim 17 (Rejected): The process according to claim 16, wherein component d) is at least one hydroxycarboxylic acid.

Claim 18 (Rejected): The process according to claim 17, wherein the at least one hydroxycarboxylic acid is a dihydroxyalkylcarboxylic acid.

Claim 19 (Rejected): The process according to claim 17, wherein the at least one hydroxycarboxylic acid is an α,α -bis(hydroxymethyl)-carboxylic acid.

Claim 20 (Rejected): The process according to claim 17, wherein the at least one hydroxycarboxylic acid is at least one selected from the group consisting of dimethylolbutyric acid and dimethylolpropionic acid.

Claim 21 (Rejected): The process according to claim 20, wherein the at least one hydroxycarboxylic acid is dimethylolpropionic acid.

Claim 22 (Rejected): The process according to claim 16, wherein the hydrophilic group of components d) comprises nonionic and ionic groups.

Claim 23 (Rejected): The process according to claim 15, wherein the polyurethane is prepared in the presence of at least one cesium salt.

Claim 24 (Rejected): A method for coating or adhesively bonding a material, comprising applying the aqueous polyurethane dispersion prepared according to Claim 15 to the material,

wherein the material is at least one selected from the group consisting of wood, wood veneer, paper, paperboard, cardboard, textile, leather, nonwoven, plastics surfaces, glass, ceramic, mineral building materials, uncoated metals and coated metals.

Claim 25 (Rejected): A method for preparing an aqueous dispersion of a water dispersible polyurethane comprising adding N-ethylpyrrolidone or N-cyclohexylpyrrolidone to a reaction mixture for forming the water dispersible polyurethanes.

IX. EVIDENCE APPENDIX

232254; 1-Cyclohexyl-2-pyrrolidone; Sigma-Aldrich online product description.

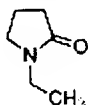
146358; 1-Ethyl-2-pyrrolidone; Sigma-Aldrich online product description.

X. RELATED PROCEEDINGS APPENDIX

None

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- [146358 \(Aldrich\)](#)
- [232254 \(Aldrich\)](#)

146358

Aldrich

1-Ethyl-2-pyrrolidone

98%

Price and Availability

Product Number	Your Price USD	Available to Ship	Quantity	Actions
146358-5G	17.40	05/29/2009 details...	<input type="text"/>	
146358-100G	114.00	Date not Available details...	<input type="text"/>	
146358-500G	367.00	Date not Available details...	<input type="text"/>	

CAS Number: 2687-91-4**Linear Formula:** C₆H₁₁NO**Molecular Weight:** 113.16**Beilstein Registry Number:** 107971**EC Number:** 220-250-6**MDL number:** MFCD00003199**PubChem Substance ID:** 24848778 [Specifications](#)[Related Products](#)[References](#)**Description****Packaging** 5, 100, 500 g in glass btl**Properties**

assay	98%
refractive index	<i>n</i> _{20/D} 1.465(lit.)
bp	97 °C/20 mmHg(lit.)
density	0.992 g/mL at 25 °C(lit.)

Safety

Personal Protective Equipment Eyeshields, Gloves, Respirators

Hazard Codes	Xn
Risk Statements	22-36
Safety Statements	26
WGK Germany	1
RTECS	UY5769250
Flash Point(F)	168.8 °F
Flash Point(C)	76 °C

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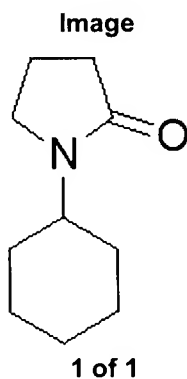
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- 232254 (Aldrich)

232254 1-Cyclohexyl-2-pyrrolidone

Aldrich High-boiling aprotic solvent., 99%

Price and Availability

Product Number	Your Price USD	Available to Ship	Quantity	Actions
232254-100G	24.30	05/29/2009 details...	<input type="text"/>	

CAS Number:	6837-24-7
Linear Formula:	C ₁₀ H ₁₇ NO
Molecular Weight:	167.25
Beilstein Registry Number:	121832
EC Number:	229-919-7
MDL number:	MFCD00003191
PubChem Substance ID:	24853888

[Specifications](#)[Related Products](#)[References](#)**Description****Application** useful for extractions, separations and purifications in a wide range of

Packaging 1 kg in glass btl
5, 100 g in glass btl

Properties

vapor pressure	0.05 mmHg (25 °C)
assay	99%
refractive index	n ₂₀ /D 1.499(lit.)
bp	154 °C/7 mmHg(lit.)
density	1.007 g/mL at 25 °C(lit.)

Safety

Hazard Codes	Xn
Risk Statements	22
Safety Statements	23-24/25
RIDADR	UN 2810 6.1/PG 2
WGK Germany	1
RTECS	UY5748450
Flash Point(F)	286 °F

Flash Point(C)	141 °C
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